

WHAT IS CLAIMED IS:

1. An ultrasonic diagnostic imaging system probe comprising:
an ultrasonic transducer array (12);
5 an integrated circuit (13) coupled to the ultrasonic transducer array (12)
which acts to process or control transducer array signals;
a fuel cell (90) coupled to the integrated circuit (13) for energizing the
integrated circuit (13); and
a source of fuel coupled to the fuel cell (90).
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2. The ultrasonic diagnostic imaging system probe of Claim 1,
further comprising a transceiver (62), coupled to the integrated circuit (13), which acts
to communicate between the probe (12) and an ultrasound system.
- 15 3. The ultrasonic diagnostic imaging system probe (12) of Claim 1,
wherein the integrated circuit (13) further comprises a beamformer integrated circuit.
4. The ultrasonic diagnostic imaging system probe of Claim 1,
further comprising a power converter (92), coupled to the fuel cell (90) and the
20 transducer array (12), which produces a stepped up voltage level in response to the
power level produced by the fuel cell (90),
wherein the fuel cell (90) further acts to energize the transducer array
(12).
- 25 5. The ultrasonic diagnostic imaging system probe of Claim 1,
further comprising a capacitor, coupled to the output of the fuel cell (90), which acts to
store energy for peak load conditions.
6. The ultrasonic diagnostic imaging system probe of Claim 1,
30 wherein the source of fuel comprises a replaceable fuel cartridge or ampule (96).

7. The ultrasonic diagnostic imaging system probe of Claim 6, wherein the fuel cartridge or ampule (96) contains a methanol- or alcohol-based fuel.

8. The ultrasonic diagnostic imaging system probe of Claim 1, wherein the fuel cell (90) further comprises an anode (72), a cathode (78), and an ion exchange membrane (76) located between the anode (72) and the cathode (78).

9. The ultrasonic diagnostic imaging system probe of Claim 8, wherein the fuel cell (13) further comprises a catalyst metal (74) which acts to promote the separation of hydrogen ions in the fuel cell (90).

10. A handheld ultrasonic diagnostic imaging system comprising:
an ultrasonic transducer array (12);
an integrated circuit (13) coupled to the ultrasonic transducer array (12)
which acts to beamform signals produced by or for the transducer array (12), and to process beamformed signals for display;
a display panel (16) coupled to the integrated circuit (13);
a fuel cell (90) coupled to the integrated circuit (13) and the display panel (16) for energizing the integrated circuit (13) and the display panel (16); and
a source of fuel coupled to the fuel cell (90).

11. The handheld ultrasonic diagnostic imaging system of Claim 10, further comprising a control panel (20) for operating the handheld ultrasonic diagnostic imaging system; and
a case (81) which houses the integrated circuit (13) and the control panel (20).

12. The handheld ultrasonic diagnostic imaging system of Claim 11, wherein the case (80) further houses the display panel (87), the fuel cell (90), and the source of fuel.

13. The handheld ultrasonic diagnostic imaging system of Claim 10, further comprising a power converter (92), coupled to the fuel cell (90) and the transducer array (12), which produces a stepped up power level in response to the power level produced by the fuel cell (90),

5 wherein the fuel cell (90) further acts to energize the transducer array (12).

14. The handheld ultrasonic diagnostic imaging system of Claim 10, further comprising a capacitor, coupled to the output of the fuel cell (90), which acts to
10 store energy for peak load conditions.

15. The handheld ultrasonic diagnostic imaging system of Claim 10, wherein the source of fuel comprises a replaceable fuel cartridge or ampule (96).

16. The handheld ultrasonic diagnostic imaging system of Claim 15, wherein the fuel cartridge or ampule (96) contains a methanol- or alcohol-based fuel.

17. The handheld ultrasonic diagnostic imaging system of Claim 10, wherein the fuel cell (90) further comprises an anode (72), a cathode (78), and an ion
20 exchange membrane (76) located between the anode (72) and the cathode (78).

18. The handheld ultrasonic diagnostic imaging system of Claim 17, wherein the fuel cell further comprises a catalyst metal (74) which acts to promote the separation of hydrogen ions in the fuel cell (90).

25 19. The handheld ultrasonic diagnostic imaging system of Claim 10, wherein the display panel (87) is further responsive to the source of fuel for the display of the amount of fuel remaining in the fuel source.

30 20. An ultrasonic diagnostic imaging system comprising:
an ultrasonic transducer array probe (12);
an ultrasound signal path (14) coupled to the transducer array probe (12);

- an image display (87) coupled to the ultrasound signal path (14);
- a control panel (20) coupled to the ultrasound signal path (14);
- a source of a.c. power coupled to energize the ultrasound signal path (14);
- a fuel cell (90) coupled to energize the ultrasound signal path (14); and
- 5 a source of fuel coupled to the fuel cell (90).

21. The ultrasonic diagnostic imaging system of Claim 19, wherein the ultrasound signal path is located in the system chassis (101) of a tabletop ultrasound system.

- 10 22. The ultrasonic diagnostic imaging system of Claim 19, wherein the ultrasound signal path (14), the image display (16), the control panel (20), the fuel cell (90) and the source of fuel are mounted on a wheeled cart.

23. The ultrasonic diagnostic imaging system of Claim 19, wherein
15 the image display (16) is further responsive to the source of fuel for the display of the amount of fuel remaining in the fuel source.

24. An ultrasonic diagnostic imaging system comprising:
- an ultrasonic transducer array probe (12);
 - 20 an ultrasound signal processor coupled to receive signals from the array probe (12);
 - an ultrasound image processor coupled to receive signals from the signal processor;
 - an image display (16) coupled to the image processor which acts to display
25 images produced by the image processor; and
 - a fuel cell (90) and fuel supply unit (46), coupled to provide energy to one or more of the array probe (12), the signal processor, the image processor, and the image display (16),
 - wherein the fuel cell (90) and fuel supply unit (46) is removable from the
30 diagnostic imaging system for replacement by another fuel cell (90) and fuel supply unit (46) by a user of the ultrasonic diagnostic imaging system.